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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
LEE, SHUN K

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/800,366	WOOD, ROLAND A.	
	Examiner	Art Unit	
	Shun Lee	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27 and 29-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27 and 29-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 May 2003 has been entered.

Interview Summary

2. Applicant has provided a record of the substance of the 21 May 2003 interview. However, it should be noted that no authoritative agreement was reached at the time of the interview. In regard to Item 1 (pg. 12 of remarks filed 29 May 2003), examiner and applicant's attorney discussed the antecedent basis in the specification for "output signal" (pg. 10, lines 7-9 and Fig. 8) and "uniform output signal" (Fig. 9). In regard to Item 2 (pg. 12 of remarks filed 29 May 2003), examiner and applicant's attorney discussed "individually control" (pg. 11, lines 13-15).

Specification

3. The amendment filed 3 September 2002 and 29 May 2003 are objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

(a) amendments filed 29 May 2003 to the paragraph beginning on pg. 8, line 8 (*e.g.*, replacing "'N' fast scanning", deletion of "longer", etc.), examiner respectfully disagrees with applicant's arguments that the new matter previously objected to (*i.e.*, replacement of "'N' fast scanning" and deletion of "longer") are supported by the specification since (a) removal of 'N' makes the "time duration not exceeding (T/(NxRxC))" within the sentence vague and indefinite since it is unclear what is meant by 'N' and (b) "longer" is a relative term which has meaning within the context of "time duration" in the immediately preceding sentence;

(b) amendments filed 3 September 2002 to the paragraph beginning on pg. 8, line 14 (*e.g.*, ... factor of N ..., etc.), examiner respectfully disagrees with applicant's arguments that the new matter previously objected to (*i.e.*, "factor of N") are supported by the specification (*i.e.*, Figs. 4 and 5 and pg. 8, lines 15-20) since the specification as filed only disclose a reduction and not a reduction by a factor of N; and

(c) amendments filed 3 September 2002 to the paragraph beginning on pg. 11, line 13 (*e.g.*, ... individually controlled ..., etc.), it is noted that applicant argues that that language has been added to overcome the objection (see also interview summary which also indicates that applicant will amend to overcome the objection), however the amendment filed 29 May 2003 fails to correspond to applicant's arguments.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Objections

4. Claims 15, 19, and 29 are objected to because of the following informalities:

(a) in claim 15, "to convert the output signal to a digital signal value" on lines 3-4 should probably be --wherein said output signal produced is a digital signal value--;

(b) in claim 19, "correction values" on line 3 should probably be --said correction values--; and

(c) in claim 29, "to convert the output signal to a digital signal value" on lines 3-4 should probably be --wherein said output signal produced is a digital signal value--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, 7, 9-17, 20, and 22-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood).

It should be noted that frame time is the time in which a microbolometer produces a complete picture or image of an object being viewed (see lines 6 and 7 on pg. 2 of the specification).

In regard to claim **14**, Wood *et al.* disclose an infrared radiation detector apparatus, comprising:

(a) microbolometers in an array (column 5, line 65 to column 6, line 1);

(b) a timing circuit coupled to the array to apply (US 5,420,419 column 6, lines 18-34) two or more bias pulses substantially sequentially to each microbolometer in the array during a frame time (*i.e.*, the exposure time for producing a complete image; column 5, lines 47-53);

(c) a measuring circuit coupled to the array to measure two or more resulting signals associated with each of the applied two or more bias pulses (*i.e.*, multiple measurements; column 5, lines 47-53) during the frame time (*i.e.*, the exposure time);

(d) a computing circuit coupled to the measuring circuit to compute an average signal value (*i.e.*, averaging of sensor signals; column 5, lines 47-53) for each microbolometer in the array from the measured two or more resulting signals during the frame time (*i.e.*, the exposure time); and

(e) an output circuit coupled to the computing circuit to produce an output signal based on the computed average value for each microbolometer in the array during the frame time (*i.e.*, the exposure time) is inherent in displaying an image corresponding to the output signals.

In regard to claim **1**, the method steps are implicit for the apparatus of Wood *et al.* since the structure is the same as the applicant's apparatus of claim 14.

In regard to claim **2** which is dependent on claim 1, Wood *et al.* also disclose (column 1, lines 55-58) recording and displaying IR images. Inherent in the formation of

images is repeating the applying, measuring, computing, and producing steps to compute output signals during each frame time in order to form an IR image.

In regard to claim **7** (which is dependent on claim 1) and claim **20** (which is dependent on claim 14), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the bias pulses are substantially equal in magnitude.

In regard to claim **9** (which is dependent on claim 1) and claim **22** (which is dependent on claim 14), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 2, lines 17-20) that the two or more bias pulses comprise two or more voltage bias pulses.

In regard to claim **10** (which is dependent on claim 1) and claim **23** (which is dependent on claim 22), Wood *et al.* also disclose (US 5,420,419 column 7, lines 26-28) that the two or more resulting signals comprise two or more current signals.

In regard to claim **11** (which is dependent on claim 1) and claim **24** (which is dependent on claim 14), Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. Inherent in an average is at least two sensor signals each associated with an applied bias pulses and thus there are in the range of about 2 to 100 bias pulses dependent on the length of the exposure.

In regard to claim **12** (which is dependent on claim 1) and claim **25** (which is dependent on claim 24), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the two or more bias pulses have time duration in the range of about 0.1 to 20 microseconds (*e.g.*, 5-6 μs).

In regard to claim **13** (which is dependent on claim 1) and claim **26** (which is dependent on claim 14), Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. The exposure time (*i.e.*, frame time) is inherently the time it takes for the array to produce a complete image of an object being viewed by the array.

In regard to claim **15** which is dependent on claim 14, Wood *et al.* also disclose (column 2, lines 57-59) that the output circuit further comprises an integrator (integrating preamplifiers 26) and an A/D converter (32) to convert the output signal to a digital signal value for each microbolometer in the array.

In regard to claim **16** which is dependent on claim 15, Wood *et al.* also disclose (column 4, lines 5-24) a digital image processor (36), coupled to the output circuit to receive the digital signal value associated with each microbolometer in the array and correct the received digital signal value for image defects.

In regard to claim **17** which is dependent on claim 16, Wood *et al.* also disclose (column 4, lines 5-24) that the digital image processor (36) further comprises a correction circuit, to apply a corrective electrical signal based on a correction value to the output signal to correct for resistance non-uniformity in each microbolometer to obtain a substantially uniform output signal value.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Applicant Admitted Prior Art.

In regard to claim **3** which is dependent on claim 2, the method of Wood *et al.* lacks applying a corrective electrical signal to the output signal to correct for resistance non-uniformity between the one or more microbolometers of the array to obtain a substantially uniform output signal value. Applicant admits (first paragraph on pg. 6) it is known in the art (such as US Patent 4,752,694) to apply a corrective electrical signal to the output signal to correct for resistance non-uniformity between the one or more microbolometers of the array (*i.e.*, "coarse non-uniformity correction") to obtain a substantially uniform output signal value. Therefore it would have been obvious to one having ordinary skill in the art to apply a corrective electrical signal in the method of Wood *et al.*, in order to obtain a substantially uniform output signal value.

In regard to claim **4** which is dependent on claim 3, Wood *et al.* also disclose (column 2, lines 57-59) an integrator (integrating preamplifiers 26) and an A/D converter (32) to converting the substantially uniform output signal associated with each microbolometer to a digital signal value.

In regard to claim **5** which is dependent on claim 4, Wood *et al.* also disclose (column 4, lines 5-24) passing the digital signal values associated with each microbolometer in the array through a digital image processor to correct for image defects.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Applicant Admitted Prior Art as applied to claim 5 above, and further in view of Thiede *et al.* (US 5,129,595).

In regard to claim **6** which is dependent on claim 5, the modified method of Wood *et al.* lacks that the image defects comprise fine offsets, gain non-uniformity, and dead pixels. Image defects such as fine offsets, gain non-uniformity, and dead pixels are well known in the art. For example, Thiede *et al.* teach (column 7, lines 45-66) the correction of gain non-uniformity and dead pixels in order to fully compensate for array non-uniformity. Therefore it would have been obvious to one having ordinary skill in the art to correct for gain non-uniformity and dead pixels in the modified method of Wood *et al.*, in order to fully compensate for array non-uniformity.

10. Claims 8, 21, 27, 29, and 33-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Duvall, III (US 5,258,619).

In regard to claim **8** (which is dependent on claim 1) and claim **21** (which is dependent on claim 20), the infrared radiation detector apparatus and method of Wood *et al.* lacks that the bias pulses are substantially equally spaced in time. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating.

Therefore it would have been obvious to one having ordinary skill in the art to adjust the bias pulses waveform parameters (*e.g.*, pulses are substantially equally spaced in time) in the infrared radiation detector apparatus and method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating as taught by Duvall, III.

In regard to claim **27**, Wood *et al.* is applied as in claim 14 above. The apparatus of Wood *et al.* lacks that the resulting temperature in each of the microbolometers in the array is substantially uniform. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Minimizing detector heating due to bias results in minimal change in detector temperature and thus the detector is at the substantially uniform initial temperature. Therefore it would have been obvious to one having ordinary skill in the art to adjust the bias pulses waveform parameters (*e.g.*, pulses are substantially equally spaced in time) in the infrared radiation detector apparatus and method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating resulting substantially uniform temperature as taught by Duvall, III.

In regard to claim **29** which is dependent on claim 27, Wood *et al.* is applied as in claim 15 above.

In regard to claim **33** which is dependent on claim 27, Wood *et al.* is applied as in claim 20 above.

In regard to claim **34** which is dependent on claim 27, Wood *et al.* in view of Duvall, III is applied as in claim 21 above.

In regard to claims **35** and **36** which are dependent on claim 27, Wood *et al.* is applied as in claims 22 and 23 above.

In regard to claims **37** and **38** which are dependent on claim 27, Wood *et al.* is applied as in claims 24 and 25 above.

In regard to claim **39** which is dependent on claim 27, Wood *et al.* is applied as in claim 26 above.

11. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Thiede *et al.* (US 5,129,595).

In regard to claim **18** which is dependent on claim 17, Thiede *et al.* is applied as in claim 6 above.

In regard to claim **19** which is dependent on claim 18, Wood *et al.* also disclose (column 4, lines 5-24) that the digital image processor (36) further comprises digital memories to store correction values for each microbolometer in the array.

12. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Duvall, III (US 5,258,619) as applied to claim 29 above, and further in view of Thiede *et al.* (US 5,129,595).

In regard to claim **30** which is dependent on claim 29, Thiede *et al.* is applied as in claim 6 above.

In regard to claim **31** which is dependent on claim 30, Wood *et al.* is applied as in claims 16 and 17 above.

In regard to claim **32** which is dependent on claim 31, Wood *et al.* is applied as in claim 19 above.

Response to Arguments

13. Applicant's arguments filed 29 May 2003 have been fully considered but they are not persuasive.

Applicant argues ("§102 Rejection of the Claims" on pg. 19-20 of remarks filed 29 May 2003) that Wood *et al.* do not disclose "to apply two or more bias pulses substantially sequentially to each microbolometer in the array during a frame time" and cites US Patent 5,420,419 Fig. 6, column 6, lines 18-34, and claim 19 as support. Examiner respectfully disagrees. First, is noted that applicant only cited evidence from the incorporated by reference US Patent 5,420,419 (Wood) and has failed to provide any evidence from Wood *et al.* (US 5,675,149). Turning to the evidence cited by applicant, it is clear from Fig. 6 of US Patent 5,420,419 that there is no illustration of the frame time. Further, US Patent 5,420,419 states (column 6, lines 18-34) that "In FIG. 6 the voltage level indicated by line 5 is that of the pulse biased current supplied to a single microbolometer in a focal plane array over time. In an 80,000 pixel array the pulse width is approximately 5 to microseconds and based on the preferred addressing scheme addressing 14 pixels at a time. The temperature curve 6 shows that a single microbolometer temperature can be raised roughly 2° C. each time the roughly 200 to 300 microamp current pulses them. The 22° Centigrade line is indicated to show the preferred temperature for the focal plane array. Note that the temperature of an individual pixel floats just above the 22° centigrade mark at all times when not pulsed with current. It should be recognized that over and above the temperature variation caused by the bias current pulses illustrated in FIG. 6, incoming radiation

from the scene causes an additional temperature variation" and (claim 19) that "Method for reading out changes in passive radiation receiving units in an n by m array of said units which forms a radiation receiving surface including: exposing the radiation receiving surface to an irradiated scene desired to be observed, thus developing a change in said receiving units related to the amount of radiation received from said scene, sweeping the receiving units with a pulse of short duration, in relation to the time required to sweep said array, of bias current that heats the sensors and is of too large an amperage to allow said units to remain stable if said pulse were of a substantially longer duration than short duration and wherein said sweep is at such a rate that each said unit has time to return to a stabilization temperature before the sweep generates a second short duration bias pulse to each said unit". Again the cited passages fail to disclose that only a single bias pulse can be applied to each microbolometer. On the contrary, it is clear that the cited passages discloses that "said sweep is at such a rate that each said unit has time to return to a stabilization temperature before the sweep generates a second short duration bias pulse to each said unit" which is illustrated as temperature curve 6 of a single microbolometer over time when supplied with pulse biased current 5. In addition, Wood *et al.* states (column 5, lines 47-53) that "If desired, slower slide velocities, or multiple scans of any desired region of the scene, can be employed to allow sensitivity improvement by multiple measurement and averaging of sensor signals: in this case, a stable platform for example, a tripod mounting of the camera may be required, analogous to long exposures of visible photographic still frame cameras". Thus, Wood *et al.* disclose obtaining sensor signal averages of the multiple measurements (wherein each measurement corresponds to a second short duration bias pulse and the timing between substantially sequentially short duration bias pulses is adjusted such that "each said unit has time to return to a stabilization temperature") so as to produce a complete picture or image within the exposure time (*i.e.*, frame time). Therefore, Wood *et al.* teaches applying two or more bias pulses

substantially sequentially to each microbolometers in the array during a frame time in order to obtain long exposure IR images.

In response to applicant's arguments ("§103 Rejection of the Claims" on pg. 20-21 of remarks filed 29 May 2003) against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878

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June 25, 2003